

White Paper

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Sustaining Cultural Heritage Collections

Sustainable Preservation Environment Project

Hesburgh Libraries, University of Notre Dame

Rare Books and Special Collections

Liz Dube, Project Director

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The Preservation Challenge

The planning grant was established to address environmental conditions posing a significant threat to the University of Notre Dame's Hesburgh Libraries' Rare Books and Special Collections (RBSC), which contain some 175,000 volumes of printed books and periodicals dating from the 15th century to the present. The collection's topical strengths include Catholic Church history and theology, Irish Studies, Latin American Studies, Italian literature, and sports history.

In 2003, a renovation of RBSC achieved the consolidation of special collections into a significantly expanded storage area with enhanced preservation and access features. The renovated facility provided a dedicated underground collection storage space isolated from staff and user workspaces, with the exception of a small vault collection that continued to be housed in a caged area on the first floor adjacent to RBSC staff office spaces. Improved collections preservation and access features include a dedicated security system and indirect, motion-controlled lighting. In addition, a significant refinement of housing practices was facilitated via the installation of various shelving configurations, flat storage, and oversized storage furniture throughout the space. The addition of such furniture and fixtures supported refined storage by size and format, enhancing the preservation and accessibility of collections.

Despite these marked improvements, the associated need for improved preservation environmental conditions to support preservation of special collections in this enhanced space remained unrealized. A principal challenge is the age of the HVAC system serving these spaces, which is original to the fifty-plus year old building and was designed to support human comfort rather than collections preservation. Relative humidity conditions within the system were poorly regulated, and the relative humidity tended to vary significantly over time, including falling below 20% for extended time periods during the winter heating system, and occasional periods of humidity above 60% during the warmer rainy seasons when campus chilled water is unavailable. The relative humidity conditions also tended to vary significantly throughout the collection storage area, with conditions most worrisome in the front (south section) of the lower level storage area. The concerning high humidity conditions were historically the most problematic in a vault storage room along the south wall, which had been vacated several years prior to this project. In addition, since the system's zoning does not isolate staff workspaces from collection storage spaces, temperature could not be lowered below tolerances dictated by people comfort—resulting in typical temperature conditions of 68-70 degrees Fahrenheit. While this temperature range is suitable for people comfort, it does not serve the long term preservation of special collections. Furthermore, this limitation prohibits lowering the temperature during the winter heating months, an action that would simultaneously boost both environmental sustainability and collections preservation aims. For these reasons, the Hesburgh Libraries sought to perform a thorough assessment to better understand and improve conditions for its rich collections while advancing campus sustainability goals for reduced energy consumption.

The University of Notre Dame Hesburgh Libraries received a \$50,000 NEH Sustaining Cultural Heritage Collections planning grant award. The funding included \$40,000 to work with environmental specialist consultants from the Image Permanence Institute and a campus-wide local team—including staff from the Libraries, Campus Utilities, Architect’s Office, and the Office of Sustainability—to assess the HVAC system and existing conditions, and to develop a plan to address significant environmental factors posing a threat to the long-term preservation of its Rare Books and Special Collections. The grant award also included \$10,000 to carry out one or more recommendation made by the planning team during the course of the project.

Project team

The multidisciplinary project team consisted of two environmental consultants from the Image Permanence Institute, Library staff from several units (Preservation, Rare Books and Special Collections, and Facilities), and University staff from strategic campus departments (Utilities, the Office of Sustainability, and the University architect’s office):

Environmental Consultants

- Jeremy Linden, Senior Preservation Environment Specialist, Image Permanence Institute
- Christopher Cameron, Sustainable Preservation Specialist, Image Permanence Institute

Hesburgh Libraries Staff

- Julie Arnott, Head of Preservation Services
- Liz Dube, Conservator
- Sue Donovan, Conservation Fellow/Special Collections Conservator
- Ross Fergerson, Facilities Manager
- Natasha Lyandres, Head of Rare Books and Special Collections
- George Rugg, Curator of North American and Joyce Sports Collections, Rare Books and Special Collections
- James Cachey, Rare Books and Special Collections staff with responsibilities in stacks management including environmental monitoring

University of Notre Dame Staff

- Mark Hummel, Assistant Director of Utilities
- Pamela James, Architect, Project Manager, Facilities Design and Operations, Planning, Design and Construction
- Linda Kurtos, Director, Office of Sustainability

Several changes to the proposed project staff occurred over the course of the project, as follows:

- Pamela James, lead Architect for the Libraries current and ongoing renovations, replaced Mike Daly on the team as her responsibilities proved a better fit for the project.

- IPI consultant Christopher Cameron replaced Shae Trewin on this project.
- In November of 2015, Liz Dube assumed the role of Project Investigator, due to Julie Arnott's retirement at the end of 2015. The two month overlap enabled a smooth transition.
- Two additional staff were added to the team:
 - Rare Book Conservator Sue Donovan, who joined the Libraries in September of 2014, participated as an active member of the team.
 - James Cachey, Rare Books and Special Collections staff with responsibilities for stacks management, managed the data loggers throughout the project. Going forward he has adopted this responsibility on a Library-wide basis as we scale up assessment and monitoring operations.

This report was submitted late due to the departure of two of the three professionals in the preservation department this year: Head of Preservation Julie Arnott retired in January, and Conservator Sue Donovan departed for a permanent conservator position in June. Interim Head of Preservation Liz Dube's resulting increased responsibilities resulted in the delayed submission of this report.

Project Activities

The project spanned October 1, 2014 through June 30, 2016. Initially proposed as a 15-month project to end Dec 31, 2015, the project was extended an additional six months via a no cost extension approved by NEH staff in order to provide more time for thorough data gathering and analysis, and to properly finesse the strategic use of the \$10,000 targeted for implementing improvements.

Over the course of the project, the environmental specialist consultants—Image Permanence Institutes' Jeremy Linden and Christopher Cameron—visited the University of Notre Dame to meet with the on-site project team on three occasions for two or three days each: November 18-20, 2014; June 2-3, 2015; and April 26-27, 2016. The meetings included a mix of targeted information-sharing and planning discussions among various team members, hands-on investigations of mechanical and building systems, implementation and maintenance of logging equipment, and data analysis and interpretation.

Accomplishments

Due to the broadened monitoring program and enhanced communication with Utilities staff, over the course of the project a number of minor issues that would assuredly have been more slow to identify and resolve were able to be identified and resolved quickly, including a couple of instances of significantly malfunctioning humidifiers.

In accord with the consultant's recommendation to "improve the return air flow from the basement area," in the spring of 2016 the University installed new return air ductwork in the south (front) half of the RBSC basement storage facility. This work was jointly funded by the University of Notre Dame and NEH funding—\$10,000 in NEH funding provided as part of this project for testing/improvements, plus a University investment of \$16,000. The ductwork successfully increased and balanced airflow to the front south section of the basement. Previously, the lack of return air ductwork in this section of the storage area meant that this section was served only by passive return air, resulting in poor airflow and significantly higher relative humidity conditions at certain times of the year than the rear storage area. While the installation of the new return ducts has coincided with a positive alignment of relative humidity conditions across the two spaces, more seasonal assessment is needed to understand its impact, as the balancing of the new ductwork coincided with the seasonal activation of the cooling coils, which has the result of lowering relative humidity conditions.

The consultant's report conveyed a range of recommendations. Some recommendations—including adjusting set points seasonally and daily overnight system shutdowns—represent ways of working with the system to maximize preservation and sustainability aims. Other recommendations involved specific remedies to the system and building infrastructure to help advance preservation aims while minimizing energy usage. These recommendations included considering resolving exterior wall moisture transfer, investigating and reducing space heat load, and investing in a new more suitable unit dedicated solely to special collections storage.

Evaluation

The project was highly successful, and it continues to grow and further impact preservation and sustainability goals. It has produced detailed and well explicated data on the environmental conditions within RBSC storage areas, as well as actionable recommendations for improving conditions going forward. It has provided actions to improve conditions, and has spurred subsequent actions to advance preservation and sustainability goals (see the following *Continuation of the Project* and *Long Term Impact* sections).

Perhaps most consequentially, the project was transformative of local capabilities and culture with respect to managing and developing preservation environments for library and archival collections. The project fostered the development of a dynamic, knowledgeable, and effectively coordinated multidisciplinary campus-wide team committed to preservation and sustainability goals. This newly refined team is able to effectively bridge departmental boundaries and individual professional identities to identify and address both short- and long-term collections preservation opportunities and challenge. The impact of this cultural shift has been game changing—it has already benefitted a number of initiatives that will significantly impact preservation and sustainability goals for decades to come. Assistant Director of Utilities Mark Hummel describes the project's impact this way:

"The work performed by IPI Consultants on the Environmental Analysis and Mechanical

System Assessment has provided a paradigm shift in the HVAC system criteria for storage of rare materials at Notre Dame. The sensitivity of the impact that temperature and humidity have on materials was put into perspective that balances the capital and operational costs of the HVAC system with the system's practical capabilities. This is especially important when dealing with an existing system.” - Mark Hummel, P.E., Assistant Director of Utilities, University of Notre Dame

Continuation of the Project

The project continues to evolve and impact preservation and sustainability aims on a variety of fronts.

In accord with the consultant’s recommendation to “expand and consolidate collection space in the basement,” collections were relocated this summer from the first floor to the consolidated lower level RBSC storage area. The assessment revealed that vault collections in the caged storage area adjacent to staff workspaces on the first floor were subject to poorer preservation conditions than those in the consolidated lower level storage area. The temperature in the basement averages a couple of degrees lower, and the relative humidity is less extreme. Vault relative humidity conditions in the winter ranged down to 20% consistently, posing significant risk in particular to the parchment materials that are well represented within the vault collection. As a result of this knowledge, vault collections previously housed on the first floor in a caged area adjacent to staff workspaces were relocated this summer to an area within the lower level compact storage that has been modified to require enhanced security. This move provides these critical and expanding collections with somewhat improved environmental conditions while affording enhanced security.

In just the few months since the project’s close, the Libraries has considerably expanded its RBSC monitoring program to incorporate significant additional collections. The program now fully encompasses all RBSC collections, all University Archives collections (comprising those housed within the Hesburgh Library as well as those housed in the new 2015 Library and Archives Annex facility), as well as significant medium rare and general collections storage areas that could potentially house special collections in the future (the entirety of compact shelving in the Hesburgh Library lower level as well as Library collections housed in the Annex facility).

In January, the University Archives merged with the Hesburgh Libraries, significantly expanding the special collections under the Hesburgh Libraries purview, and creating an opportune moment to fold the Archives’ extensive special collections into the Libraries monitoring program. The newly expanded monitoring initiative is providing data on baseline conditions that will inform space planning studies being performed in conjunction with renovations planning for RBSC and University Archives.

The need to upgrade the Libraries’ eClimate notebook subscription to support the expanded monitoring program created an opportunity for further campus-wide collaboration and

integration—this summer the Hesburgh Libraries and Snite Museum of Art combined monitoring programs under an unlimited Professional Plus eClimate Notebook subscription. This consolidation facilitates broader campus wide collaboration and information-sharing among various departments with similar missions.

The expanded campus-wide temperature and relative humidity monitoring program comprises 54 loggers continuously gathering data on conditions across multiple departments residing in four buildings: the Hesburgh Library, the Architecture Library, the Library and Archives Annex shelving facility, and the Snite Museum.

Long Term Impact

As noted the project has facilitated campus collaborations on a number of levels. The University architect's and Utilities offices have become more empowered to promote collections preservation measures within their purviews. The Utilities department is implementing the report's recommendations by engaging consultants to perform feasibility studies and cost estimates for the various modification and testing scenarios outlined in the consultant's final report. Once costs and implications are known, Utilities staff will reconvene with the library team to prioritize recommendations on a cost-benefit model and seek to identify funding to implement the most highly strategic measures.

At the same time, learned from this project are significantly impacting renovation planning.

Preservation storage of special collections has quickly become a fundament aspect of planning for a newly combined and expanded RBSC and Archives facility within Hesburgh Library. As Mark Hummell, Assistant Director of Utilities, notes:

The Assessment also established clear objectives for the construction standards for new and renovated spaces. The knowledge gained will be beneficial to the University for generations to come.” - Mark Hummel, P.E., Assistant Director of Utilities, University of Notre Dame

Thanks to the groundwork laid out in this assessment project, a fundamental component of this planning now involves insuring that the Libraries newly expanded special collections are provided with sustainable preservation storage conditions. Space needs and feasibility studies are being prepared to identify the most energy efficient ways to provide practical preservation storage conditions for special collections going forward. As part of this assessment, the entirety of the lower level of the Hesburgh Library building (most of which currently houses general collections) is being monitored to determine existing conditions in those spaces. Creative options, including onsite retrofit versus an additional annex facility, are being envisioned and assessed. The University Architects and Utilities departments, Shepley Bulfinch Architecture firm, and other engaged consultants are collaborating with Library and Archives staff on this initiative to plan to provide preservation storage conditions for special collections. Pamela James, Lead Architect for Library Renovations, describes the transformative impact of this

assessment project as follows:

“The Environmental Analysis and Mechanical System Assessment conducted by IPI Consultants will be instrumental in assisting the architects and engineers on the current planning and design efforts for the Special Collections renovation within the Hesburgh Library. This report provides information on the existing mechanical systems that may impact the programmatic layout for the Special Collections renovation including where particular programmatic functions should be strategically located on the lower level, first and second floors of the library.

The report also provides recommendations that will be helpful to assist the design consultants to incorporate into the scope of the renovation for various levels of infrastructure improvements. These infrastructure improvements include the replacement of an Air Handling Unit (AHU S-5), replacement of exterior windows to reduce condensation, and investigation of the exterior walls to mitigate moisture transfer of the exterior wall.

By understanding and using this report during the planning and design process for the future renovation of Special Collections, will allow us to plan for an overall holistic approach to the project so both program functions and infrastructure improvements are incorporated without compromising future preservation efforts of the collections once these areas are renovated.” - Pamela J. James, Architect, Project Manager, Facilities Design and Operations, Planning, Design and Construction, University of Notre Dame

Local Project Promotion

Information about the project was disseminated locally via an article in the campus staff newspaper (NDWorks, May 2016, page 6): http://www3.nd.edu/~ndworks/2016_May.pdf.

Formal presentation and publication

IPI Senior Preservation Consultant Jeremy Linden and Hesburgh Libraries Interim Head of Preservation Services Liz Dube are preparing a case study paper on this successful application of NEH Sustaining Cultural Heritage Collections assessment grant program. The paper, “What Do You Mean Telecom Servers and Preservation Don’t Mix? – Sustainable Preservation Environments and the Building of an Environmental Team,” will be presented to the American Institute for Conservation Annual Meeting on May 31, 2017 in Chicago, IL. The paper abstract was selected for inclusion by the conference review panel. The paper will also be submitted for publication following the conference presentation.

The case study presentation and publication will promote the potential of this relatively new and highly specialized NEH grant program to cultural heritage collecting institutions. The paper

will support NEH guidelines and available white papers by promoting a nuanced real life example of how an NEH Sustaining Cultural Heritage Collections Assessment Grant was used to balance and maximize collections preservation and environmental sustainability goals. In particular, the paper will highlight both the explicit benefits of such a project as well as the less tangible systematic long term benefits to the institution's culture and organizational effectiveness.